JUMO di 308
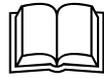## Digital Indicator

Contents

Contents

1 Introduction

1.1 Preface

This operating manual is addressed to the system manufacturer with adequate technical background and PC related knowledge.

Please read this operating manual prior to commissioning the instrument. Keep the manual in a place accessible to all users at all times. Your comments are appreciated and may assist us in improving this manual.

Warranty

All necessary settings are described in this operating manual. Should problems be encountered during commissioning, please refrain from carrying out any manipulations that are not described in the manual. Any such intervention will jeopardize your warranty rights. Please contact the nearest subsidiary or the head office.

Electrostatic discharge

When accessing the inner parts of the unit and returning plug-in modules, assemblies or components, please observe the regulations according to EN 61340-5-1 and EN 61340-5-2 „Protection of electrostatic sensitive devices". Only use **ESD** packaging for transport.

Please note that we cannot accept any liability for damage caused by ESD.

ESD=**E**lectro **S**tatic **D**ischarge

1.2 Typographical conventions

1.2.1 Warning signs

Danger

This symbol is used when there may be **danger to personnel** if the instructions are ignored or not followed correctly!

Caution

This symbol is used when there may be **damage to equipment or data** if the instructions are ignored or not followed correctly!

1 Introduction

ESD

This symbol is used where special care is required when handling **components liable to damage through electrostatic discharge**.

1.2.2 Note signs

Note

This symbol is used when your **special attention** is drawn to a remark.

Reference

This symbol refers to **further information** in other manuals, chapters or sections.

Footnote

abc[1]

Footnotes are remarks that **refer to specific points** in the text. Footnotes consist of two parts:
A marker in the text and the foot note text itself.
The markers in the text are arranged as continuous superscript numbers.

1.2.3 Carry out action

Instruction to act

＊

This symbol indicates that an **action to be performed** is described. The individual steps are marked by this asterisk, e.g.:

＊ Start PLC software

＊ Click on hardware catalog

Vital text

This text contains important information, and it is vital that you read it before going any further.

String of commands

File ➜ save as

Small arrows between words indicate a **string of Commands** to be executed in succession.
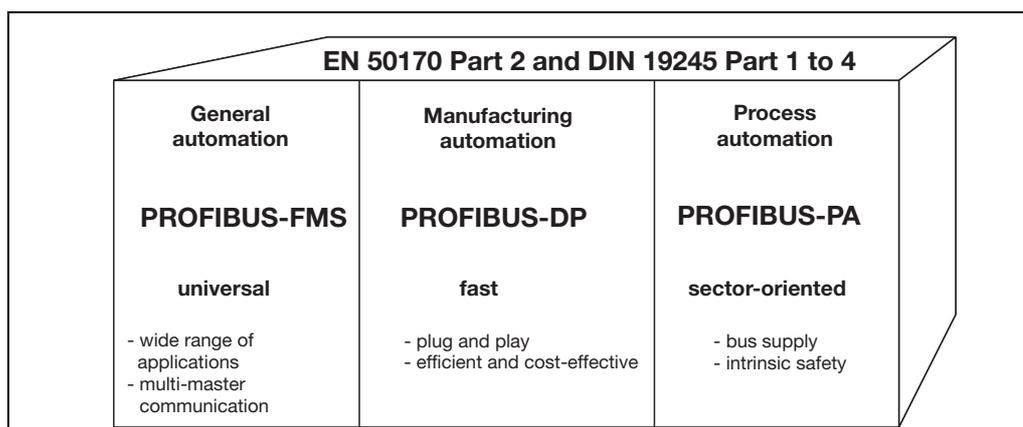
2 PROFIBUS-DP description

PROFIBUS

PROFIBUS is a manufacturer-independent, open fieldbus standard for a wide range of applications in manufacturing, process and building automation. Manufacturer independence and openness are ensured by the international standards IEC 61158 and IEC 61784.

With PROFIBUS, devices from different manufacturers can communicate without any special interface adaptation. PROFIBUS can be employed for both high-speed time-critical data transmission and extensive, complex communications tasks. Three PROFIBUS variants are available.

2.1 PROFIBUS types

EN 50170 Part 2 and DIN 19245 Part 1 to 4		
General automation	**Manufacturing automation**	**Process automation**
PROFIBUS-FMS	**PROFIBUS-DP**	**PROFIBUS-PA**
universal	**fast**	**sector-oriented**
- wide range of applications - multi-master communication	- plug and play - efficient and cost-effective	- bus supply - intrinsic safety

The PROFIBUS family

PROFIBUS-DP

This PROFIBUS variant optimized for high speed and low connection costs, has been specially tailored for communication between automation control systems (PLC's) and distributed field devices (typical access time < 10ms). PROFIBUS-DP can be used to replace conventional, parallel signal transmission with 24V or 0/4-20mA.

The following application protocols have been defined for PROFIBUS-DP:

DPV0:   Cyclic data transfer

DPV1:   Cyclic and acyclic data transfer

DPV2:   Slave-to-slave communication, amongst others, takes place in addition to cyclic and acyclic data transfer.

☞ The device subject to this manual only supports cyclic data transfer as per DPV0.

PROFIBUS-PA

PROFIBUS-PA has been specially designed for process engineering. It permits the linking of sensors and actuators to a common bus cable, even in explosion endangered zones. PROFIBUS-PA allows data communication with and energy supply to two-wire technology devices according to MBP (Manchester Bus Powering), specified in the international IEC 61158-2 standard.

2 PROFIBUS-DP description

PROFIBUS-FMS This is the universal solution for communication tasks at the cell level (typical access time approx. 100ms). The powerful FMS services open up a wide range of applications and provide a high degree of flexibility. FMS is also suitable for extensive communication tasks.

2.2 RS485 transmission technology

Basic characteristics Transmission takes place according to the RS485 standard. It covers all areas in which high transmission speed and simple, cost-efficient installation technology is required. A shielded, twisted copper cable with one conductor pair is used.

The bus structure permits addition and removal of stations or step-by-step commissioning of the system without affecting other stations. Later expansions have no influence on the stations already in operation.

Transmission speeds can be selected within a range of 9.6kbit/s and up to 12Mbit/s. During system commissioning, one uniform speed is selected for all devices connected to the bus.

Network topology	Linear bus, active bus termination at both ends, stub cables are only permissible for transmission rates of <1.5Mbit/s.
Medium	Shielded, twisted-pair cable
Number of stations	32 stations in each segment without repeater (line amplifier). With repeaters, extension to 126 stations is possible.
Connector	Preferably 9-pin sub-D connector

Structure All devices must be connected in a line structure (one after another). Up to 32 stations (master or slaves) can be linked up with one segment. If there are more than 32 stations, repeaters are required.

Cable length The maximum cable length depends on the transmission speed. The cable length specified can be extended by the use of repeaters. It is recommended to limit the number of repeaters connected in series to a total of 3.

The following table shows the range based on the transmission speed (when cable type A is used).

Transmission (baud) rate (kbit/s)	9.6	19.2	93.75	187.5	500	1500	12000
Range/segment	1200m	1200m	1200m	1000m	400m	200m	100 m

Cables and connectors

Cable type A:

|	
Characteristic impedance:	$135…165\,\Omega$
Capacitance per unit length:	$< 30\,pF/m$
Loop resistance:	$110\,\Omega/km$
Core diameter:	$0.64\,mm$
Core cross-section:	$> 0.34\,mm^2$

It is preferable to use a 9-pin sub-D connector for PROFIBUS networks incorporating RS485 transmission technology. The PIN assignment at the connector and the shield connection are shown in the following text.

PROFIBUS-DP cables and connectors are offered by several manufacturers. Please refer to the PROFIBUS product catalog (www.profibus.com) for types and addresses of suppliers.
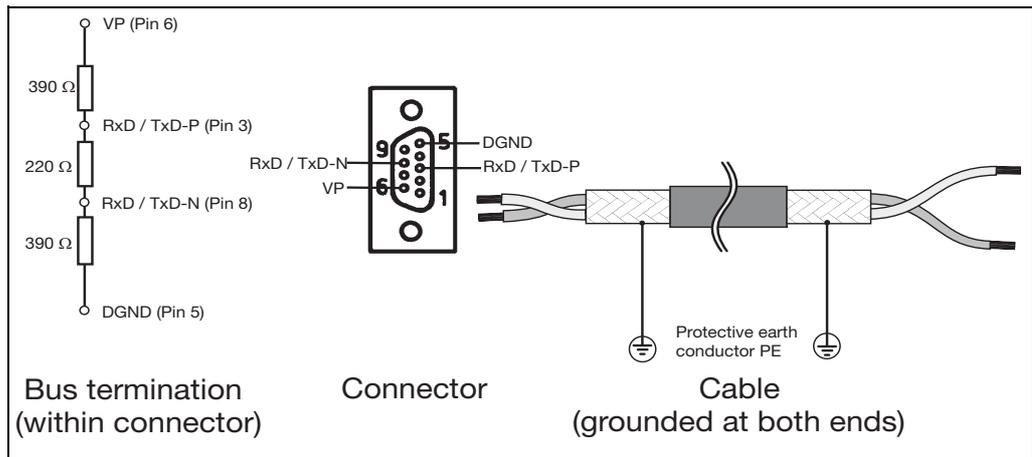
Bus termination

At both ends of each segment the bus is terminated by termination resistors. To ensure malfunction-free operation, make sure that voltage is applied to both bus terminations at all times.

The termination resistors are located in the Profibus plugs and can be activated by moving the slide switch to „on".

maximum 30 further devices
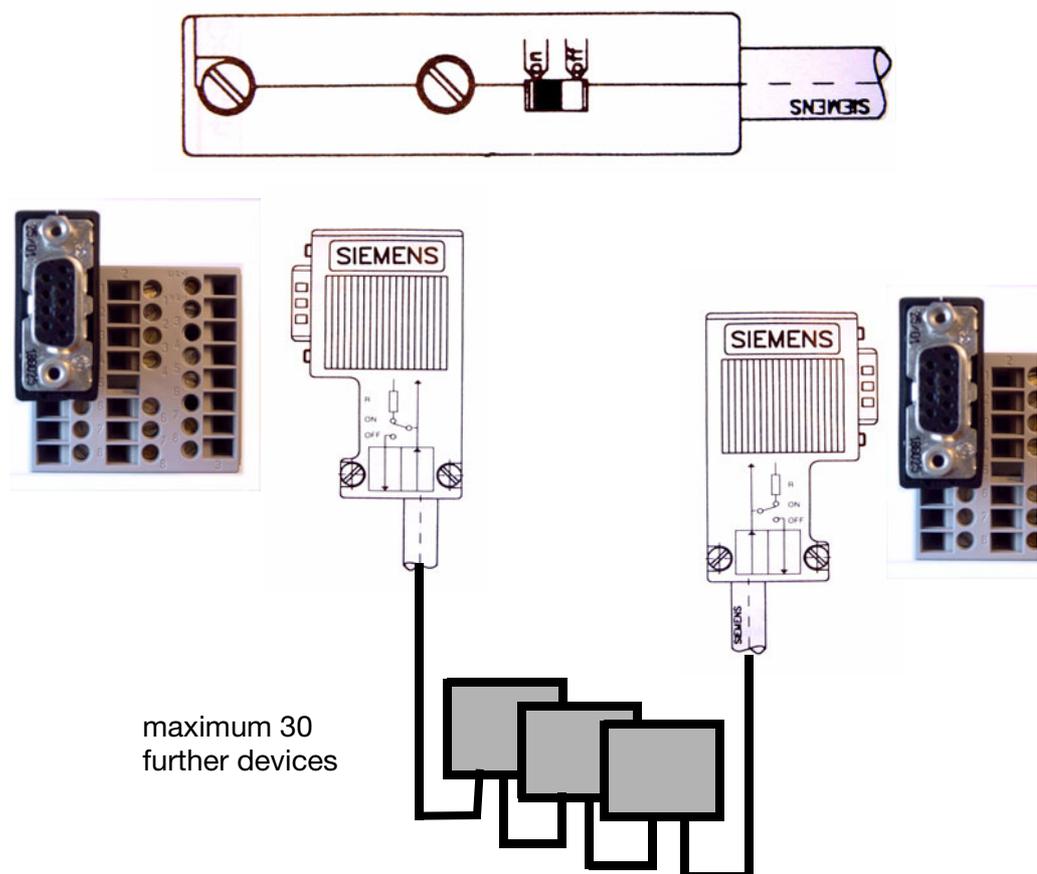
2 PROFIBUS-DP description

PIN assignment, bus termination and shielding

Bus termination (within connector)   Connector   Cable (grounded at both ends)

Installation recommendations

When connecting the devices, make sure that the data lines are not reversed. We strongly recommend to use a shielded data cable. The braided shield and the screen foil underneath (if any) should be connected to the protective earth on both sides, with good conductivity. Furthermore, the data lines should be routed separately from all high-voltage cables, as far as this is possible.

As a suitable cable, we recommend, for instance, the following type from Siemens:

Simatic Net Profibus 6XV1
Order No.: 830-0AH10
* (UL) CMX 75 °C (Shielded) AWG 22 *

For installation, the use of stub cables must be avoided for transmission rates ≥ 1.5 MBit/s.

➡ For important information on installation, please refer to the Installation Guidelines PROFIBUS-DP, Order No. 2.111 from PNO (PROFIBUS Nutzerorganisation).

Address:
PROFIBUS Nutzerorganisation e.V.
Haid-und-Neu-Straße 7
76131 Karlsruhe
GERMANY

Internet: www.profibus.com

Recommendation:

Please follow the installation recommendations given by PNO, especially for the simultaneous use of frequency changers.

2.3   PROFIBUS-DP functions

PROFIBUS-DP is designed for high-speed data exchange at the field level. The central control devices, PLC/PC for instance, communicate through a fast serial connection with distributed field devices, such as I/O, paperless recorders and controllers. Data exchange with these distributed devices is mainly cyclic. Communication functions required for this purpose are defined by the basic PROFIBUS-DP functions in accordance with IEC 61158 and IEC 61784.

Basic functions

The central control system (master) reads the input information cyclically from the slaves and writes the output information cyclically to the slaves. The bus cycle time must be shorter than the program cycle time of the central PLC. In addition to cyclic user data transmission, PROFIBUS-DP also provides powerful functions for diagnostics and commissioning.

Transmission technology:
- RS485, twisted pair
- Baud rates of 9.6 kbit/s up to 12 Mbit/s

Bus access:
- Master and slave devices, max. 126 stations on one bus

Communication:
- Peer-to-peer (user data communication)
- Cyclic master-slave user data communication

Operating states:
- Operate: Cyclic transmission of input and output data
- Clear: Inputs are read, outputs remain in a secure state
- Stop: Only master-master data transfer is possible

Synchronization:
- Sync mode
- Freeze mode

Functionality:
- Cyclic user data transfer between DP master and DP slave(s)
- Dynamic activation or deactivation of individual DP slaves
- Checking the configuration of the DP slaves
- Address assignment for the DP slaves via the bus
- Configuration of the DP master via the bus
- maximum of 246 bytes input/output data for each DP slave

Protective functions:
- Address monitoring for the DP slaves
- Access protection for inputs/outputs of the DP slaves
- Monitoring of the user data communication with adjustable monitoring timer in the DP master

---

Device types:
- DP master class 2, e.g. programming/project design devices
- DP master class 1, e.g. central automation devices, such as PLC, PC...
- DP slave, e.g. devices with binary or analog inputs/outputs, controllers, recorders...

---

2 PROFIBUS-DP description

☞ The device described in this manual does not support the following functions:
- Operating state „Clear"
- Synchronization types „Sync mode" and „Freeze mode"

Cyclic data transmission

The data transmission between the DP master and the DP slaves is automatically carried out by the DP master in a defined, recurring order. During bus system configuration, the user defines the assignment of a DP slave to the DP master. The user also defines the DP slaves that are to be included in, or excluded from, the cyclic user data transmission.

Data transmission between the DP master and the DP slaves is divided into three phases: parameterization, configuration and data transfer. Prior to a DP slave entering the data transfer phase, the DP master checks in the parameterization and configuration phase, whether or not the intended configuration matches the actual device configuration. In the course of this check, the device type, format and length information as well as the number of inputs and outputs must coincide. These checks provide the user with reliable protection against parameterization errors. In addition to the user data transfer, which is automatically performed by the DP master, new parameterization data can be sent to the DP slaves at the request of the user.
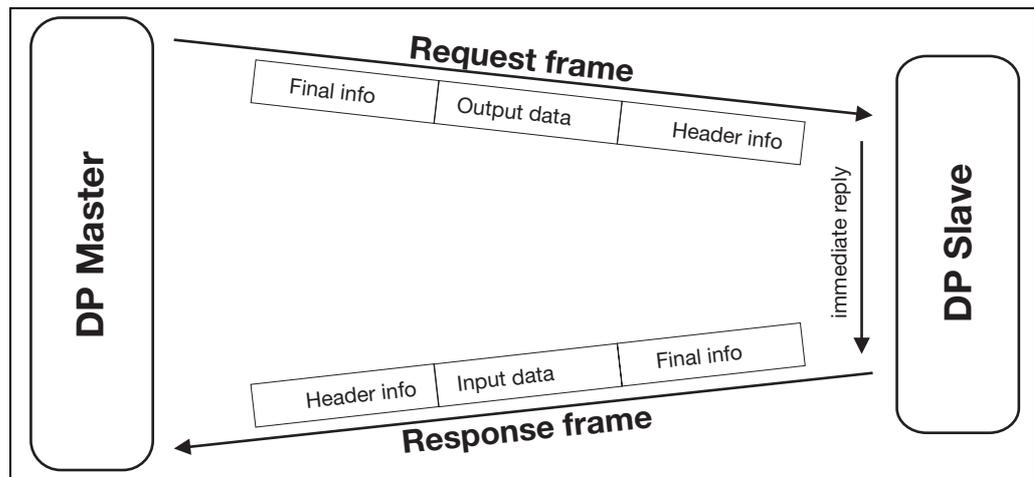
User data transmission in PROFIBUS-DP

2.4 Data format

The device described in this manual allows different data formats to be set at the configuration level.

⇨ Chapter 4.2 „Interface parameters";
Setting the protocol

Integer values

The transmission order of the individual bytes depends on the protocol set.

	Motorola format:	**Intel format:**
the	High-Byte	Low-Byte first
followed by the	Low-Byte	High-Byte

Float values / Real values

In the device, Float values/real values are stored in the IEEE-754 standard format (32 bit).

Single-float format (32 bit) as per IEEE 754 standard

SEEEEEEE	EMMMMMMM	MMMMMMMM	MMMMMMMM
Byte 1	Byte 2	Byte 3	Byte 4

S - sign bit (Bit31)
E - exponent (two's complement) (Bit23...Bit30)
M - 23 bits normalized mantissa (Bit0...Bit22)

Example of real number

Representation of the real number 50.0 in the single-float format (32 Bit) according to the IEEE 754 standard:

Bit 31 ... 24	Bit 23 ... 16	Bit 15 ... 8	Bit 7 ... 0
SEEE EEEE	EMMM MMMM	MMMM MMMM	MMMM MMMM
0100 0010	0100 1000	0000 0000	0000 0000
Byte 1 = 0x42	Byte 2 = 0x48	Byte 3 = 0x00	Byte 4 = 0x00

Calculation from sign, exponent and mantissa:

S = 0
E = 100 0010 1 (= 132_{10})
M = 100 1000 0000 0000 0000 0000

$$Value = -1^S \cdot 2^{E-127} \cdot (1 + M_{b22} \cdot 2^{-1} + M_{b21} \cdot 2^{-2} + M_{b20} \cdot 2^{-3} + M_{b19} \cdot 2^{-4} + \ldots)$$

$$Value = -1^0 \cdot 2^{132-127} \cdot (1 + 1 \cdot 2^{-1} + 0 \cdot 2^{-2} + 0 \cdot 2^{-3} + 1 \cdot 2^{-4})$$

$$Value = 1 \cdot 2^5 \cdot (1 + 0.5 + 0 + 0 + 0.0625)$$
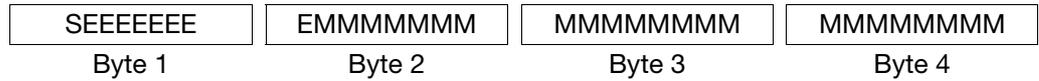
$$Value = 1 \cdot 32 \cdot 1.5625$$

$$Value = 50.0$$

2 PROFIBUS-DP description

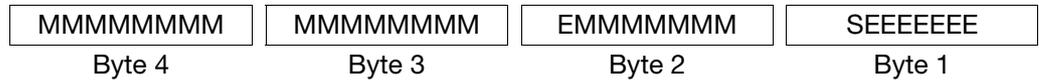**Transmission of float/ real values**

The transmission order of the individual bytes depends on the protocol set.

Motorola format
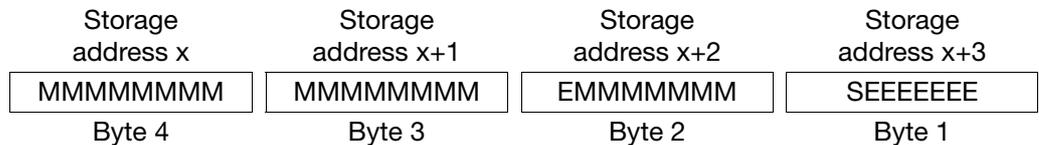
SEEEEEEE	EMMMMMMM	MMMMMMMM	MMMMMMMM
Byte 1	Byte 2	Byte 3	Byte 4

Intel format

MMMMMMMM	MMMMMMMM	EMMMMMMM	SEEEEEEE
Byte 4	Byte 3	Byte 2	Byte 1

Use of float/ real values

Please check how float/real values are stored in your application. It might be necessary to swap bytes accordingly after or before transmission.

Many compilers (e.g. Microsoft C++, Turbo C++, Turbo Pascal, Keil C51) store the values in the following order (Intel compatibility):

Storage address x	Storage address x+1	Storage address x+2	Storage address x+3
MMMMMMMM	MMMMMMMM	EMMMMMMM	SEEEEEEE
Byte 4	Byte 3	Byte 2	Byte 1

3 Configuring a PROFIBUS-DP system

3.1 The GSD file

Device data (GSD) allow open project design.

PROFIBUS-DP devices have different performance features. They differ with respect to the available functionality (e.g. number of I/O signals, diagnostic messages) or the possible bus parameters, such as baud rate and time monitoring. These parameters vary individually for each device type and manufacturer. To accomplish a simple configuration for PROFIBUS-DP, the characteristic device features are defined in an electronic data sheet (device data base file, GSD file). The standardized GSD files expand open communication up to the operator level. Simple and user friendly integration of devices from different manufacturers is possible by means of the project design tool, which is based on the GSD files. The GSD files provide clear and comprehensive description of the features of a device type in a precisely defined format. GSD files are created for the specific application. The defined file format permits the project design system to simply read in the device data of any PROFIBUS-DP device and to automatically use this information for the bus system configuration. As early as in the project design phase, the project design system can automatically perform checks for input errors and the consistency of data entered in relation to the entire system.

The GSD files are subdivided into three sections.

- **General specifications**
  This section contains, amongst others, information on manufacturer and device names, hardware and software release versions, and the baud rates supported.

- **DP master-referenced specifications**
  This section is used to enter all parameters related to DP master devices only, such as the maximum number of DP slaves that can be connected, or upload and download options. This section is not available for slave devices.

- **DP slave-referenced specifications**
  This section contains all slave-related information, such as the number and type of the I/O channels, specifications of diagnostic texts and information on the consistency of I/O data.

The GSD file not only includes lists, such as the baud rate supported by the device, but also the possibility of describing the modules available in a modular device.

The GSD file is included in the delivery of a DP slave. As an option, the manufacturer can also provide a GSD generator for the user to create a GSD file.

3 Configuring a PROFIBUS-DP system

3.2 GSD generator

3.2.1 General information

The GSD generator available for the device subject of this manual enables the user to create an individual GSD file.

In this manner, a selection of the variables (parameters) that can be transmitted via PROFIBUS-DP can be made to adapt the GSD file to the individual application.

Once the device is selected, all variables available appear in the „Parameters" window. Only when these have been copied either to the „Input PLC" or „Output PLC" window, will they later be contained in the GSD file for further processing or pre-processing by the DP master (PLC).

3.2.2 Operation

Program mask

File menu

Window with available parameters

Input window (input for master/PLC)

Output window (output for master/PLC)

These addresses are referred to in the Modbus interface description.

If different GSD files are required for devices of the same type, this default name has to be altered in such a way as to enable unambiguous assignment in the hardware catalog. (This name can be different from that under which the GSD file was saved).

Delete entry from input window

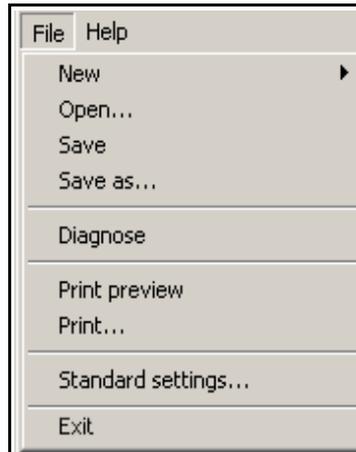Delete entry from output window

Exit program

If SIMATIC S7 (Siemens) is used for project design, the name of the GSD file must not be longer than 8 characters.

GSD files with longer names cannot be entered into the PLC hardware catalog!

File menu The file menu can be called up using the Alt-D key combination or by the left mouse button. It provides the following options:

New	After calling up the function for the creation of a new GSD file, the available devices are selected. After selecting the required device, all available parameters are shown in the parameter window.
Open	This function opens an existing GSD file.
Save/ Save as	This function is used to save the generated or edited GSD file.
Diagnosis	This function can be used to test the GSD file in conjunction with a PROFIBUS-DP master simulator from B+W and the DP slave.
Print preview	shows a preview of a report that can be printed.
Print	prints a report that contains additional information for the PLC programmer (such as data type of the selected parameters).
Standard (default) settings	The language to be used at the next restart of the program can be selected here.
Exit	exits the program.

3 Configuring a PROFIBUS-DP system

Report (example)

```
I/O REPORT


Instrument:       [Gerätename]


Length of inputs ( Bytes ):        29
Length of outputs ( Bytes ):       10



Inputs


Byte      Description                                    Type
----------------------------------------------------------------
[  0]     Interface-Status                               BYTE
[  1]     Analogue inputs\Analogue input1                REAL
[  5]     Analogue inputs\Min value1                     REAL
[  9]     Analogue inputs\Max value1                     REAL
[ 13]     Analogue inputs\Hold value1                    REAL
[ 17]     Mathematics\Mathematic1                        REAL
[ 21]     Logic\Position 0x0026                          INTEGER
[ 23]     Binary\Relay outputs    0x0021                 INTEGER
[ 25]     Binary\Limit comparators 0x0024                INTEGER
[ 27]     Binary\Binary inputs    0x0023                 INTEGER



Outputs


Byte      Description                                    Type
----------------------------------------------------------------
[  0]     Commands\Command indicator 0x0041              INTEGER
[  2]     Commands\Command Operation 0x0042              INTEGER
[  4]     Commands\Control of binary outputs             INTEGER
[  6]     Configuration\Limit  LC1                       REAL
[ 10]     Text\process text 1-24                         TEXT
```
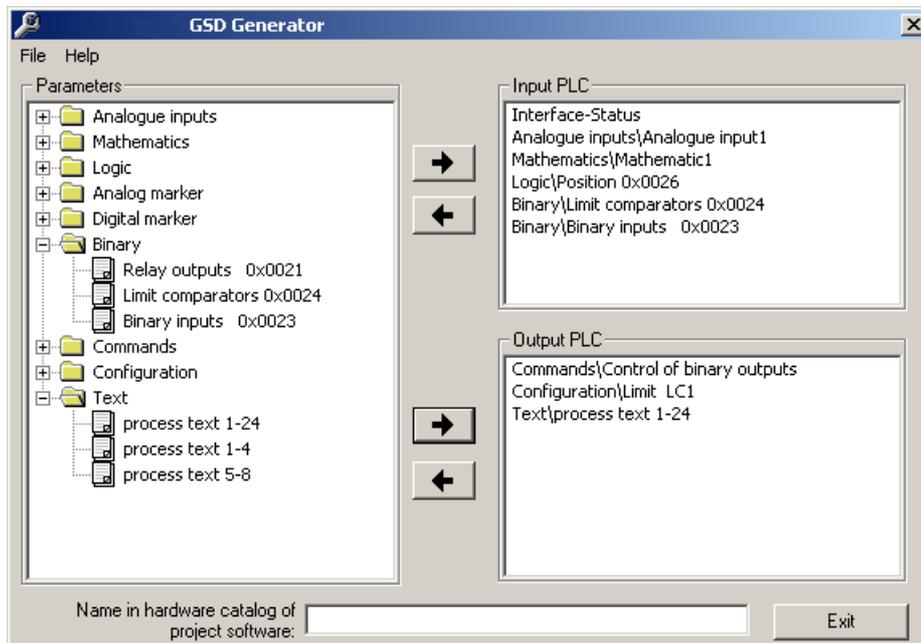
3.2.3 Parameterizing

**Select
parameter**

When an existing file has been opened or a new file created, all available parameters are shown in the parameter window.

A click with the left mouse button on the „+" or „-" symbol will extend or reduce the parameter list.

„Click" on the parameters with the left mouse button, keep the button pressed while copying the parameter → to the input or output window by pressing the right-pointing arrow key. Optionally, parameters can also be „pulled" into the required window by keeping the mouse button pressed (Drag&Drop).

**Remove
parameter**

Parameters are deleted from the input or output window by pressing the left-pointing arrow key ← .

☞ The „Interface-Status" parameter automatically appears in the input window and cannot be deleted. This parameter is used for diagnosis of the internal data transmission in the device and should be evaluated by the PLC program to ensure data validity.

Interface status = 0: internal communication in the device is OK
(values unequal 0: faulty communication in the device)

3 Configuring a PROFIBUS-DP system

Configuration of a GSD file (Example)

```
; ============================
; GSD-File Gateway PROFIBUS-DP
; [name of DP-instrument]
; Release 03.07.2007
; ============================
;
;
#Profibus_DP
GSD_Revision = 2                         ;extended GSD-file is supported
;                                        ;according to PNO directrive of 14.12.95
Vendor_Name = „ "                        ;name of the manufacturer
Model_Name = „ "                         ;name of the DP-instrument
Revision = „Ausgabestand 2.0"            ;actual edition of the DP-instrument
Ident_Number = 0x0B28                  ;exact type designation of the DP-instrument
Protocol_Ident = 0                       ;protocol characteristica PROFIBUS-DP
Station_Type = 0                         ;DP-Slave
FMS_supp = 0                             ;DP-instrument only
Hardware_Release = „1.00"                ;actual edition of the hardware
Software_Release = „2.00"                ;actual edition of the software
;                                        ;the following baudrates are supported
9.6_supp = 1                                 ;   9.6  kBaud
19.2_supp = 1                                ;  19.2  kBaud
;                                            ;  31.25 kBaud (PA)
45.45_supp = 1                               ;  45.45 kBaud
93.75_supp = 1                               ;  93.75 kBaud
187.5_supp = 1                               ; 187.5  kBaud
500_supp = 1                                 ; 500    kBaud
1.5M_supp = 1                                ;   1.5  MBaud
3M_supp = 1                                  ;   3    MBaud
6M_supp = 1                                  ;   6    MBaud
12M_supp = 1                                 ;  12    MBaud
;
MaxTsdr_9.6 = 60
MaxTsdr_19.2 = 60
;                                            ;  31.25 kBaud (PA)
MaxTsdr_45.45 = 60
MaxTsdr_93.75 = 60
MaxTsdr_187.5 = 60
MaxTsdr_500 = 100
MaxTsdr_1.5M = 150
MaxTsdr_3M = 250
MaxTsdr_6M = 350
MaxTsdr_12M = 800
;
Redundancy = 0                           ;no redundant transmission
Repeater_Ctrl_Sig = 1                    ;Plug signal  CNTR-P  TTl-level
24V_Pins = 0                           ;Plug signals  M24V and P24 V not
connected
Implementation_Type = „SPC3"             ;Application of ASIC SPC3
;
;
;                                        ;*** Slave specific values ***
Freeze_Mode_supp = 0                     ;Freeze-mode is not supported
Sync_Mode_supp = 0                       ;Sync-mode is not supported
Auto_Baud_supp = 1                       ;Automatic recognition of baudrate
Set_Slave_Add_supp = 1                   ;Set_Slave_Add is supported
Min_Slave_Intervall = 6                  ;Slave-Interval  = 0.6 ms
Modular_Station = 1                      ;Modular station
Max_Module = 9
Max_Diag_Data_Len = 6                    ;
Slave_Family = 0                         ;
;
```

Configuration of a GSD file (Example - continued)

```
;                                                    ;*** Parameterization ***
;
;This lines are for locating PBC file, and initial data length.
;Do not disturb!!!
;atPBC_File = C:\...
;atINIT_LEN = 2
;
User_Prm_Data_Len = 40
User_Prm_Data = 0x00, 0x03, 0x06, 0x03, 0x13, 0x00, 0x35, 0x04, 0x13, 0x00, \
0x3D, 0x04, 0x11, 0x00, 0x26, 0x02, 0x11, 0x00, 0x21, 0x02, 0x11, \
0x00, 0x24, 0x02, 0x11, 0x00, 0x23, 0x02, 0x21, 0x00, 0x27, 0x02, \
0x23, 0x00, 0x43, 0x04, 0x6B, 0x3C, 0x00, 0x00
Max_Input_Len = 17
Max_Output_Len = 30
Max_Data_Len = 47
;=================== Input Master ========================================
Module = "Interface Mode" 0x10
Preset = 1
Endmodule
Module = "Analogue inputs/Analogue input1" 0x13
Preset = 1
Endmodule
Module = "Mathematics/Mathematic1" 0x13
Preset = 1
Endmodule
Module = "Logic/Position 0x0026" 0x11
Preset = 1
Endmodule
Module = "Binary/Relay outputs   0x0021" 0x11
Preset = 1
Endmodule
Module = "Binary/Limit comparators 0x0024" 0x11
Preset = 1
Endmodule
Module = "Binary/Binary inputs   0x0023" 0x11
Preset = 1
Endmodule
;=================== Output Master =======================================
Module = "mmands/Control of binary outputs" 0x21
Preset = 1
Endmodule
Module = "Configuration/Limit  LC1" 0x23
Preset = 1
Endmodule
Module = "Text/process text 1-24" 0x6B
Preset = 1
Endmodule
```

The configuration of the GSD file is designed for installation on SIMATIC S7 (SIEMENS).

In the event of installation problems with other controls, delete all Preset=1 entries.

In this case, in the PLC process image, it is also necessary to set up the variables selected in the GSD generator in the correct order.
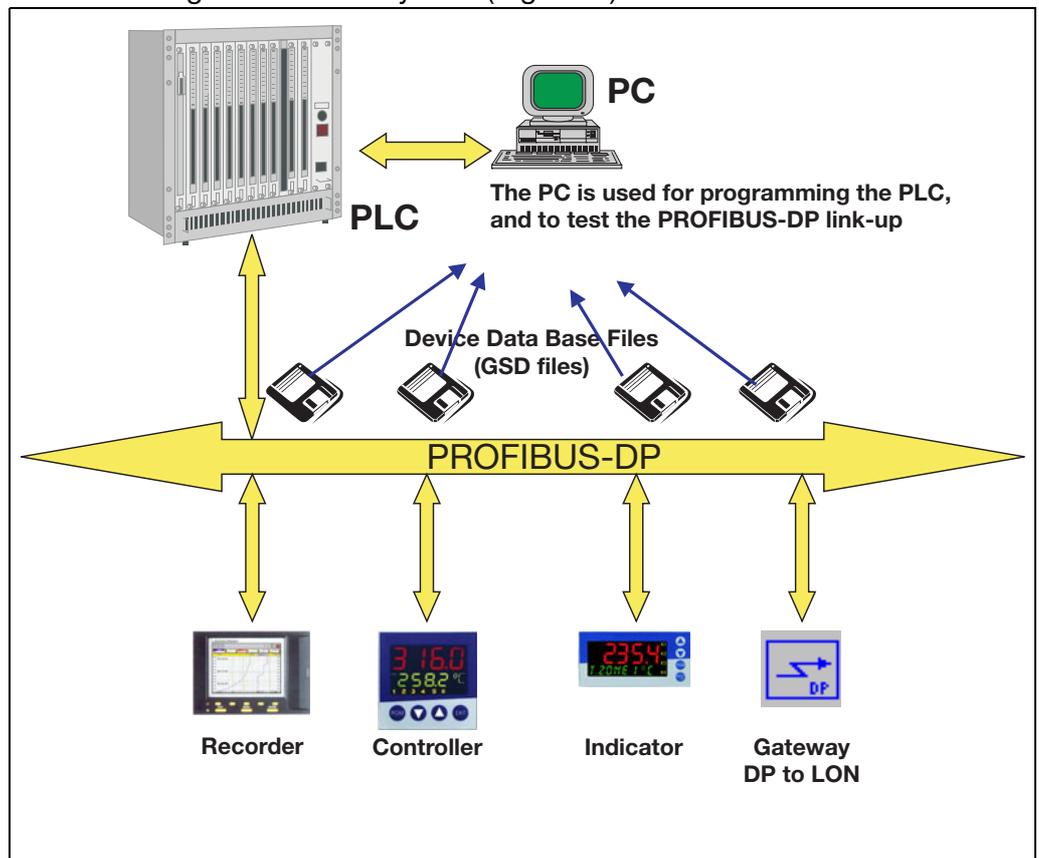
3 Configuring a PROFIBUS-DP system

3.3 Configuration procedure

Principle

To simplify configuration of the PROFIBUS-DP system, the DP master (PLC) is configured with the aid of the PROFIBUS-DP configurator and the GSD files, or with the hardware configurator in the PLC.

Sequence of a configuration:

- Create a GSD file with the aid of the GSD generator (if a GSD file is not available from the manufacturer)

- Load the GSD files of the PROFIBUS-DP slaves in the PROFIBUS-DP configuration software

- Carry out configuration

- Load configuration in the system (e.g. PLC)

PC

PLC

The PC is used for programming the PLC, and to test the PROFIBUS-DP link-up

Device Data Base Files (GSD files)

PROFIBUS-DP

Recorder   Controller   Indicator   Gateway DP to LON

PROFIBUS-DP configurator / hardware configurator (PLC)

This configuration software (such as STEP 7 of the SIMATIC S7 PLC family) can read in GSD files from PROFIBUS-DP devices of any manufacturer and integrate these files to configure the bus system.

As early as in the project design phase, the PROFIBUS-DP configurator automatically checks the entered files for system consistency errors.

The result of the configuration is read into the DP master (PLC).

The configuration software is not included in the delivery of a DP slave.

3.4 Connection example

The example below shows the path for the connection of a device to a SIMATIC S7.

✱ Connect the device to the PLC.

✱ Set the device address.
The device address can be set using the device keys or the setup program.

3.4.1 Creating a GSD file

✱ Start the GSD generator on your PC (Example):
Start ➔ *Programs* ➔ *(...)Devices* ➔ *PROFIBUS* ➔ *GSD generator)*

✱ Creating a new GSD file:
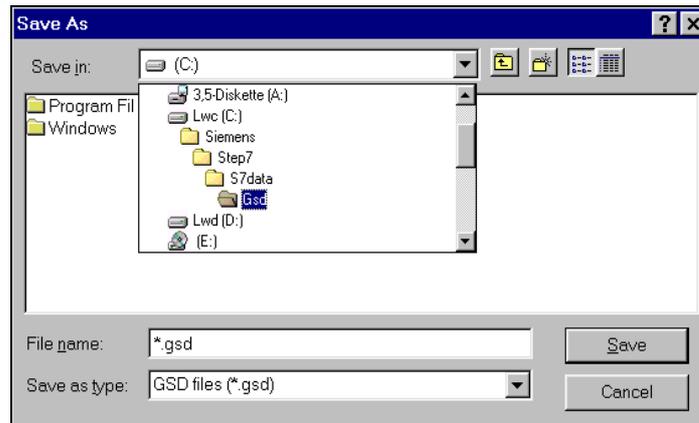*File* ➔ *New*➔ *(...)*
Select the device from the list of devices.

✱ In the „Parameters" window, select a variable that is to be used by the DP master.

✱ Press the arrow key (or using Drag&Drop) to move the variable into the „Input PLC" or „Output PLC" window.
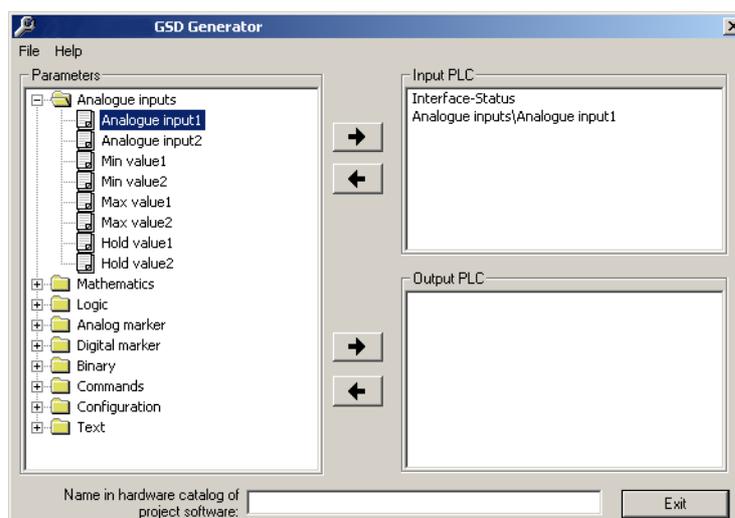
✱ Proceed in the same manner with further variables.

✱

* Save the GSD file in any folder.

✋ If SIMATIC S7 from SIEMENS is used for project design, the name of the GSD file must not be longer than 8 characters.

3.4.2 PLC configuration

* Start the PLC software

* Call up the hardware configuration and execute the menu command „Install new GSD".

PLC with its components

Bus
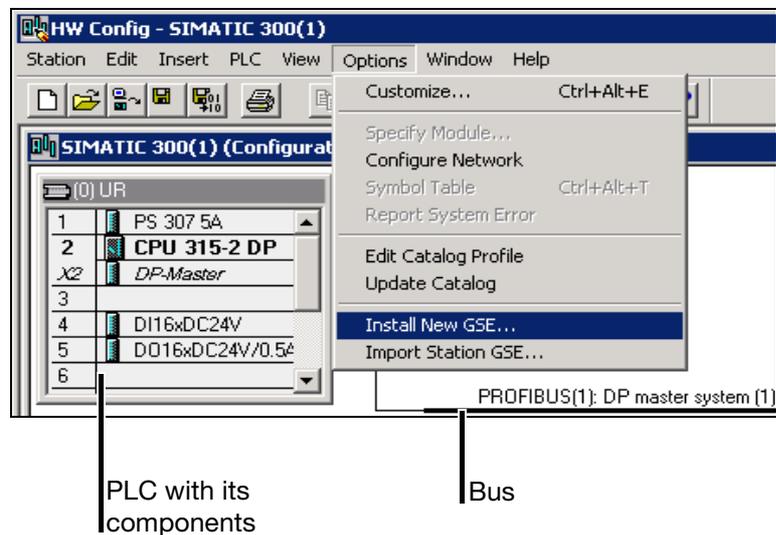
The new GSD file will be read in and processed, and the device inserted into the hardware catalog.

✳ Open the hardware catalog.
The new device is contained under its device name (not shown here).

✳ Place the new device in the working area.
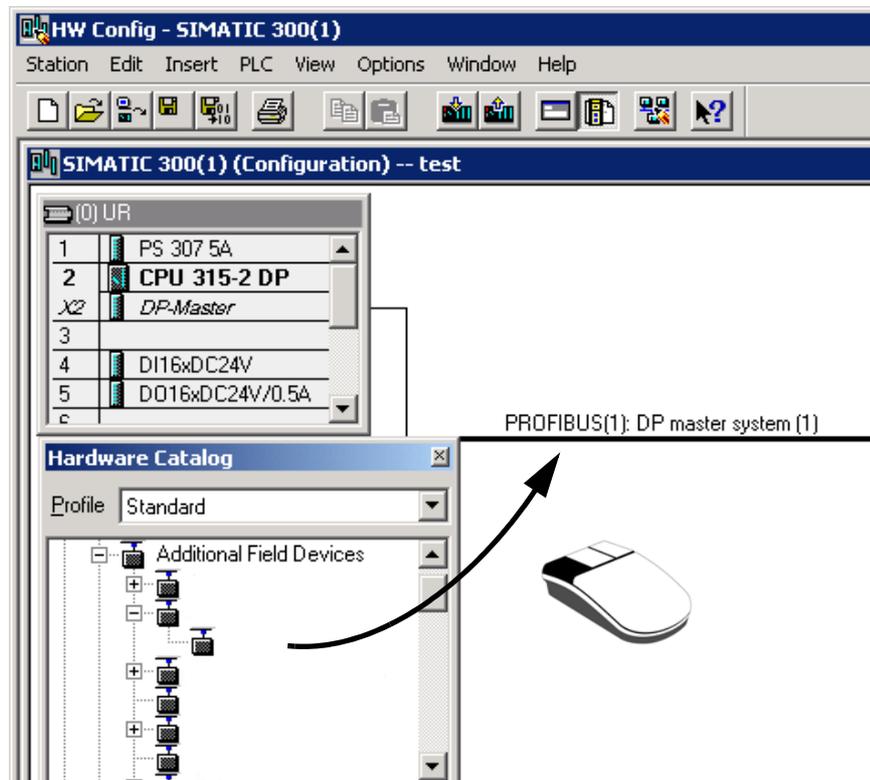
The device is placed on the bus by clicking on the left mouse button. After releasing the mouse button, the device address has to be assigned.

☞ Via the GSD file of the slaves, the master receives information on which baud rates are supported.

3 Configuring a PROFIBUS-DP system

✱ Finally, load the configuration into the PLC (*Target system* ➜ *Download to module*).
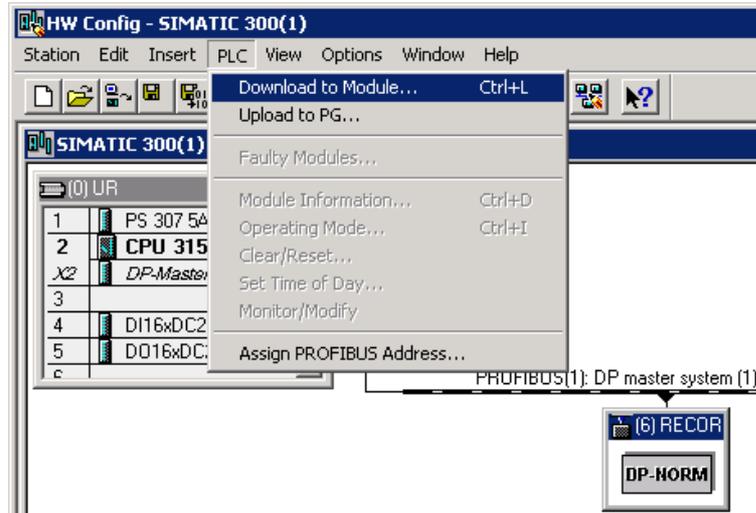
☞ If a device with PROFIBUS-DP interface is operated on a master system (PLC), suitable error analysis routines should be provided in the master system.

In conjunction with a SIMATIC S7, we recommend to install the OB86 in the PLC, so that failure of a PROFIBUS-DP device can be detected, analyzed and registered for the specific plant.

☞ The parameter „Interface status" should be analyzed by the PLC program to diagnose the internal data transmission in the device, so that, for instance, a communication problem within the device can be detected by the PLC master.

Interface status = 0: internal communication in the device is OK
(values unequal 0: faulty communication in the device)

4.1 Connection

Equipment   The PROFIBUS-DP interface can be plugged in one of the three optional slots. Any slot can be used, however, the number of interface modules to be used is limited to one.
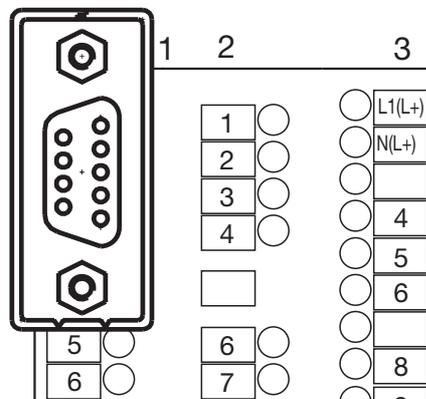
⇨   When factory-equipped, the position of the interface module has to be identified by way of the type designation. Please refer to operating manual B 70.1550.0.

View on the terminal strips
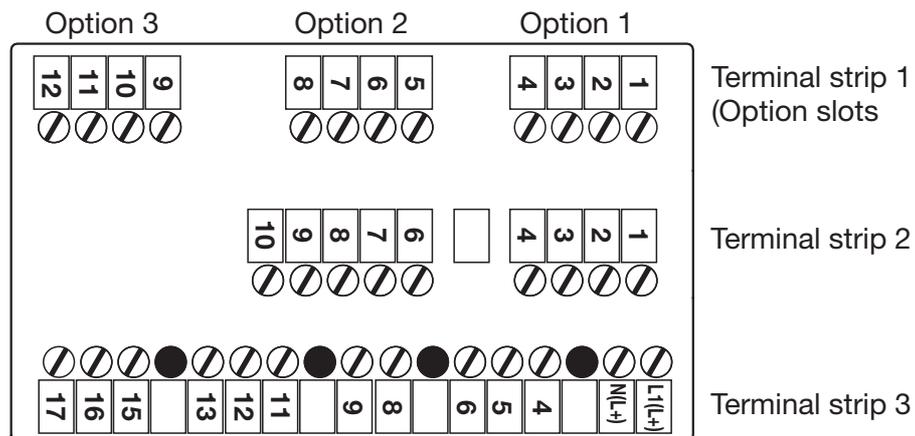
Fitting the adapter
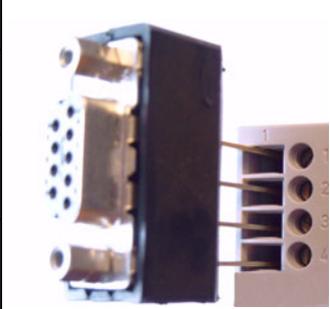
This example shows the PROFIBUS-DP interface located on the optional slot 1

☞   To fit the sub-D adapter, open the black housing accommodating the adapter PCB to gain access to the connection screws in the back plate of the device.
For correct pin assignment, ensure that the adapter is fitted as shown above.

4 PROFIBUS-DP interface

Assignment of the 9-pin sub-D socket connector

Pin on sub-D socket connec-tor		Pin on terminal strip 1: Signal (Example for optional slot 1)	Designation
6		1: VP	Voltage supply, positive
3		2: RxD/TxD-P	Receive/Transmit data, positive
8		3: RxD/TxD-N	Receive/Transmit data, negative
5		4: DGND	Ground

4.2   Interface parameters

Settings are made in the configuration level
(CONFIG → INTERFCE → PROFIBUS):

	Symbol	Value/Selection	Description
Protocol	PROTOCOL	0	Intel
		1	**Motorola**
		2	Intel integer
Device address	ADDRESS	0…**125**…255	Address in data network
			(Address 0: PROFIBUS without function)
Analog marker	ANA-VAL	-19999…**0**…+99999	Analog value
Binary marker	BIN-VAL	**0**…255	Binary value

Factory settings are shown **bold**.

⇨ For more detailed information about configuration, please refer to operating manual B 70.1550.0.

Information on the use of a PLC type SIMATIC S7 (Siemens):

Setting on the SIMATIC S7	Meaning
1…124	Slave address, as set
125	A default setting of the slave address can be made by the bus master.

The baud rate is determined automatically (max. 12 MBit/s).

4.3   Diagnostic and status messages

In the event of communication problems with the device, the „PROF-ERR" error message appears in the display.

Please check both wiring and the master (PLC). A restart of the system may be necessary.

This error message can be suppressed by setting slave address 0.

☞   When slave address 0 is set, communication via PROFIBUS is not possible.

4 PROFIBUS-DP interface

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